SCOTTISH
FIRE AND RESCUE SERVICE
Working together for a safer Scotland

Climate Change Response Plan
2045

SSN Sustainable Scotland Network

Adaptation Scotland
supporting climate change resilience

Green Action

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1. CLIMATE CHANGE

Climate change is accelerating, impacting all nations and societies, with the most severe impacts often falling on the countries with the least resilience and most vulnerable communities. However, climate change is increasingly impacting upon developed and resilient countries like Scotland. Global CO_2 emissions are continuing to rise causing climate change to accelerate and intensify. The Intergovernmental Panel on Climate Change (IPCC) has stated that the world has until 2030 to limit global temperature rise to 1.5°C. If the temperature increases beyond 1.5°C it is feared that the world will have reached a tipping point of no return.

The Scottish Fire & Rescue Service (SFRS) will be on the front line in responding to the impacts of climate change on Scotland. SFRS will also reduce and limit our own contribution to the causes of climate change.

1.1   The Global Impact

As the planet warms, global ice reserves will melt and sea levels will rise. This will further exacerbate changes in global and regional weather patterns. The key physical impacts of this have been identified by the IPCC, they are:

- Melting of ice caps and glaciers,
- Rising sea levels,
- Thawing of permafrost,
- Increased / decreased rainfall,
- Increased / decreased temperatures,
- Increased weather related natural disasters e.g. hurricanes and floods,
- Ocean acidification,
- Habitat & ecological loss.

1.2   The Local Impact

Scotland's geographical location, temperate climate, stable government and advanced economy make it far more resilient and able to prepare for climate change than many nations. However, this does not mean that Scotland will be shielded from the impacts. Scottish Natural Heritage predicts the following impacts on Scotland:

- Food supply security,
- Energy supply security,
- Water quality and availability,
- Soil degradation,
- Increase wildfire risk,
- Flood risk,
- Increased threat to human health from diseases new to these latitudes.

The predicted increase in wildfire risk is a result of longer and sustained hot and dry periods, causing fires that are burning with increased intensity. This accelerating climate trend presents new challenges in modelling and analysis as SFRS have real difficulty in comparing past performance with current and future requirements. This is because the fires from the past are not the same as the fires we will face, and have been facing in the last few years.

Some of Europe's foremost fire analysts are forecasting that in the next 30 years we will see fire behaviour in North Europe similar to that being experienced in Portugal now. If SFRS doesn't radically change our response methods we will be overwhelmed and simply won't have the capacity to deal with the fires we might face.

1.3   Impact upon the Scottish Fire and Rescue Service

The Scottish Fire and Rescue Services will experience the impacts of climate change both operationally and upon its assets.

Operational impacts will include:

- Increased frequency and more severe flooding events,
- Increased frequency and scale of wildfires,
- Increased frequency of cold weather events,
- Regional water shortages,
- More frequent and intense storms resulting in infrastructure damage.

Regarding impacts on SFRS Assets, the SFRS estate has 57 Stations that are classed as being at high risk of flooding. Due to changes in flood plains, driven by climate change impacts, SFRS will need to either invest in flood mitigation measures on these sites or consider relocating.

Working environments in SFRS buildings may be very hot in summer and cold in winter, placing new stresses on old infrastructure and an increase in energy demand from heating and cooling systems. This may impact upon employee comfort and productivity levels. Due to the dynamic nature of climate change and static conditions provided by the built fabric, much of our estate will be unable to meet the new climatic challenges without transformation.

The SFRS fleet will also be required to adapt to meet the challenges presented by more frequent weather extremes. Increased flooding risks will place greater demand on rescue boats and supporting equipment. Extreme winters will lead to increased demand for vehicles with 4x4 capabilities. Increased wild fires may also require specialist fleet to access remote rural locations to deliver equipment and supplies to support firefighting efforts.

The World Meteorological Organisation (WMO) Secretary-General Petteri Taalas (co-chair of the Science Advisory Group of the UN Climate Summit) made the following statements, in relation to the WMO report The Global Climate in 2015-19, published 22nd September 2019.

" Climate change causes and impacts are increasing rather than slowing down."

" It is highly important that we reduce greenhouse gas emissions, notably from energy production, industry and transport. This is critical if we are to mitigate climate change and meet the targets set out in the Paris Agreement."

" To stop a global temperature increase of more than 2°C above pre-industrial levels, the level of ambition needs to be tripled. And to limit the increase to 1.5°C, it needs to be multiplied by five."

2.1 The United Nations Sustainable Development Goals

In 2015 the United Nations set 17 Sustainable Development Goals. The 17 'Global Goals' and 169 targets comprise an internationally agreed performance framework setting out target areas and the outcomes required to address the pressing need for global sustainability, of which tackling climate change is key.

The Global Goals are intended to facilitate engagement from all countries, communities and industries. Themes that are key to SFRS include Climate Change, Environmental Degradation, Poverty, Inequality and Health and Wellbeing. Universal adoption of the SDGs enables a uniform and structured approach to global challenges, ensuring that specific organisations are pooling resources in a combined response.

2.2 The Paris Climate Agreement 2016

In 2016 the United Nations met in Paris to agree the United Nations Framework Convention on Climate Change (UNFCCC), which sought to address global greenhouse-gas-emissions mitigation, adaptation, and finance. The central aim of the Paris Climate Agreement 2016 was to strengthen the global response to climate change by keeping global temperature rises below 2°C. Following the agreement, the United Nations Framework Convention on Climate Change invited the IPCC to provide a special report, Global Warming of 1.5°C.

The report modelled the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change.

The IPCC report details that, at the current rate of CO_2 emissions, global warming will increase average temperatures by 1.5°C, this being a significant tipping point for catastrophic climate change. Should global temperatures increase by greater than 1.5°C, the impacts predicted to be far greater. The IPCC stated that "limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in all aspects of society". Addressing the IPCC target forms the core target for current Scottish Government Policy.

It has been 18 months since the IPCC report was published. We have already lost approximately 1/6 of the time we have left to save the planet.

2.3 Scottish Government Climate Emergency & Targets

2.3.1 Scotland's National Performance Framework 2018 (NPF)

The 2018 'outcomes based' framework (Appendix B) is founded on the Global Goals and is intended to distil the global goals into an appropriate context for Scotland and address all component groups within Scotland providing both, a common structure to enable delivery on specific goals, and a comprehensive national performance reporting platform. It seeks to address, national and local government, businesses, voluntary organisations and people living in Scotland.

SFRS will use the format adopted by the National Performance Framework to enable us to identify the most appropriate Global Goals, and therefore set an accurate scope for the SFRS response to climate change. This methodology will also ensure that SFRS is well placed for future reporting requirements. SFRS has a particularly strong role to play in the following key outcomes of the NPF; Communities, Health and the Environment.

2.3.2 Climate Emergency 2019

Scotland's First Minister, Nicola Sturgeon, declared a climate emergency in April 2019 following global youth campaigns against the lack of action that is being taken on climate change. The climate emergency declaration resulted in Scotland introducing the world's most ambitious climate targets.

2.3.3 Climate Change (Emissions Reduction Targets) (Scotland) Act 2019

Scotland's Climate Change Act 2009 was amended on 25th September 2019. The most striking changes were to sharply accelerate carbon reduction targets, to reduce CO_2 by 75% against 1990 levels by 2030, by 90% by 2040 and to make Scotland a net-zero carbon society by 2045, 5 years before the rest of the UK. The revised targets will end Scotland's contribution to climate change within a generation.

The Act sets an 'outcomes based' Programme setting out policies and proposals to prepare Scotland for the challenges that we will face as our climate continues to change in the decades ahead. The Programme is a requirement of the Climate Change (Scotland) Act 2009 and addresses the risks set out in the UK Climate Change Risk Assessment (UK CCRA) 2017, published under section 56 of the UK Climate Change Act 2008.

Climate Change Adaptation is defined by the IPCC as "adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities". For SFRS a key area that this is likely to influence is the way that we design and use our buildings.

SFRS is a key stakeholder in the Scottish Government's Climate Change Adaptation Programme (2019), and is a nominated delivery partner in four of the seven published national outcomes:

- Outcome 1 Communities
- Outcome 2 Climate Justice including Health
- Outcome 4 Supporting Systems
- Outcome 5 Natural Environment

2.3.4 Commitment to the Scottish Government Goals

The Scottish Government's Climate Emergency response has determined that the need to reduce carbon as one of the central delivery mechanisms to mitigate catastrophic climate change. The Act and Policy set the undernoted carbon reduction targets and interim targets, the most challenging of any nation states;

- Scotland will reduce carbon emissions by 75% by the year 2030, ten years from now.
- Scotland will reduce carbon emissions by 90% by the year 2040, twenty years from now.
- Scotland will be carbon net zero by 2045.
- Identifying the contributory role that transport plays in carbon emissions, Scotland will end the sale of petrol and diesel fuelled vehicles by 2032.

SFRS will respond directly to the Scottish Government targets and to Global UN SDG 13, which calls for us to "Take urgent action to combat climate change and its impacts."

SFRS will drive down all carbon emissions wherever opportunity and resource exists and strive to meet the net zero carbon target of 2045. Given the interim target of reaching 75% reduction in only ten years we must take all conceivable action.

2.3.5 The Big Climate Conversation

The Big Climate Conversation, The Role of the Public Sector in Tackling Climate Change is a Scottish Government consultation that was launched on 11th September 2019. The consultation sought the views of Scottish Public Sector Bodies on what they should be doing to tackle climate change.

The first part of the consultation was about how information is provided and shared and how Public

Sector Bodies collaborate with each other and the rest of Scotland. Views were sought on the training and guidance available to public sector leaders and proposals for a High Ambition Climate Network of Public Sector Bodies.

The second part of the consultation was about improving the reporting arrangements to simultaneously reduce the administrative burden on Public Sector Bodies and drive action. Views were sought on whether Public Sector Bodies should set targets for themselves to achieve zero greenhouse gas emissions and on other changes to the reporting duties.

2.4 Scottish Government Support for Public Bodies

2.4.1 Sustainable Scotland Network

The Sustainable Scotland Network (SSN) is the national network for public sector sustainability and climate change professionals. It exists to support the public sector in Scotland in order to deliver on sustainable development and climate change. SFRS is represented within the SSN Steering Group by the SFRS Sustainability Manager. By fully engaging and helping to advise the SSN, SFRS is demonstrating commitment to mitigating climate change and forming valuable links with key stakeholders.

2.4.2 Adaptation Scotland

Adaptation Scotland is a programme funded by the Scottish Government and delivered by the sustainability charity Sniffer. The Adaptation programme intends to help public sector, businesses and communities to understand what climate change will mean across Scotland, and identify the best way for them to plan for the impact – taking the opportunities and preparing for the risks.

SFRS will utilise the materials and support provided by Adaptation Scotland to assess and benchmark the Service's maturity against the Adaptation Capability Framework. The Service has undertaken the Strategic Climate Change Risk Assessment to evaluate the vulnerability of SFRS to climate risks and to outline mitigation measures.

The need to respond to climate change is clear, the need is articulated at global, national and regional levels as articulated in Section 2. SFRS has been leading the response to the threats and impacts of climate change for several years, and will continue to lead by encouraging our communities to adapt to the impacts of climate change.

SFRS reports publicly on its carbon emissions, both through the Sustainability Report within the Annual Report and Accounts and to the Scottish Government within the SSN Climate Change Report. The Sustainability Report informs the whole lifecycle of our assets and is used to identify carbon reduction opportunities in asset management. Operational trend analysis continually informs developing and dynamic operational capabilities responding to current and emerging threats.

We are key stakeholders in public-sector sustainability reporting, sharing carbon and environmental reporting mechanisms and we contribute through the Sustainable Scotland Network. We continue to engage with key climate change stakeholders including the Scottish Environmental Protection Agency (SEPA) and play an active role in the Scottish public sector's response to climate change mitigation and adaptation.

We have changed our organisational structure in response to the growing challenges posed by accelerating climate change by forming an executive cross functional Environmental and Carbon Management Board (ECMB). This ensures that a balanced and measured approach to carbon reduction, pollution prevention and environmental impact reduction is embedded within Service decisions.

The SFRS Sustainability Team was formed in August 2018 to deliver and manage the Service's Environmental Management System and Carbon Management Plan. This team also informs our ECMB by providing guidance together with a range of organisation specific targets and interventional projects which align SFRS and Scottish Government goals.

We will drive down carbon emissions in line with Scottish Government direction and will take positive action wherever the opportunity and resources combine. We recognise the Scottish Government's long-term commitment to deliver a net zero emissions Scotland by 2045 and will align SFRS policy and activities accordingly.

Scotland has set the most stringent carbon reductions of any nation state to date. Meeting these targets whilst maintaining Service Delivery and adapting to evolving climatic conditions presents SFRS with one of our greatest organisational challenges to date: to deliver a sustainable Service which fully responds to the Scottish carbon reduction targets. We will work to support our communities in tackling climate change and to address our own carbon emissions.

3.1 Supporting our Communities to Tackle Climate Change

When the eight legacy Services were amalgamated into the SFRS, the need to transform the Service to continue to protect our communities from new and emerging risks, including the impacts of climate change, was identified. In doing so, the essential role that SFRS plays in supporting our communities to mitigate against causes of climate change, principally carbon emissions from fires, was also identified. This is achieved by;

1. Working to Prevent Fires
2. Building Community Resilience to Respond to Climate Change
3. Developing Capacity to Respond to New and Growing Risks

3.1.1 Working to Prevent Fires

Fires release significant quantities of carbon into the atmosphere and the most effective way of mitigating this is to prevent the fires in the first instance. Prevention and Protection (P&P) is primarily focused on our community safety messaging and is carried out through Thematic Action Plans (TAPs). This is continually reviewed based on incident data and partner feedback and has seen an increase in focus on climate related messaging. We provide advice leaflets on areas such as Wildfire, The Muirburn Code, Water Safety and Deliberate Fire Setting. The advice leaflets help to educate and inform the public so that they are aware of how to behave in the countryside when the risk of fire is elevated. If we can stop the number of fires starting as a result of the acts or omissions of the public we will see a significant reduction in the number of wildfires, and their associated emissions.

P&P staff across Local Senior Officer (LSO) Areas develop and deliver specific community safety initiatives aimed at the reduction of fires through

education and the increased resilience of communities through water, home and road safety advice. Each of these areas are indirectly related to extreme weather events and climate change.

The Fire Engineering Team works closely with Local Authority Building Standards Scotland and developers to support the use of innovative building techniques and the adoption of new technologies to support a sustainable built environment. Specifically, the use of time equivalence modelling to reduce structural requirements, the promotion of fire suppression systems within buildings to reduce the likelihood and scale of any fire, smoke extraction, ventilation systems, pressurisation and automatic shuttering to reduce the spread of fire and the specification of enhanced detection systems to support early detection.

The SFRS Fire Safety Enforcement teams carry out approximately 8000 audits in premises per year to check compliance with regulation. A key element of these visits is to inform and educate on duty holders on fire safety and help prevent fire incidents. This role may be expanding to include climate change impact awareness and adaptation. This prevention work is complemented by SFRS Fire Investigation teams who identify trends to inform and direct prevention strategies. The recent White Goods Safety Campaign is an example of this, where older, more energy intensive, and potentially high risk white goods appliances were identified for replacement.

The promotion and provision of smoke detection within domestic premises is a key pillar of the SFRS' prevention strategy and this will be enhanced by the newly legislated increased level of detection within domestic premises and the planned increase in requirement for sprinklers within houses with multiple occupations (HMO's), HMO's providing care, flats and maisonettes. These twin measures should contribute to the decrease in number and severity of fires in a domestic premise. The promotion and adoption of new technology in the home setting further increases community resilience through improved detection, remote monitoring and specific technology such as household flood alarms and mobile suppression systems. The SFRS Home Fire Safety Visit (HFSV) programme sees approximately 70,000 homes receiving bespoke fire safety advice and smoke detection fitted where appropriate.

3.1.2 Building Community Resilience to Respond to Climate Change

SFRS works closely with communities and partner agencies across Scotland to plan for and respond to emergency situations. These partnerships will be increasingly important in the coming years as the effects of climate change are realised. To assist with effectively planning for emergencies at local levels, a variety of tools have been implemented.

Community Risk Registers are produced by multi-agency resilience partnerships within local areas to identify the likely risks and rate them in terms of their potential impact and likelihood of occurring. The results of these assessments are used to inform the partnership and produce agreed and effective multi-agency plans and procedures. An example of this is undertaking wildfire risk assessments to identify areas that contain potential fuel, and removing it. In doing so a resilient landscape can be created, with planned fire breaks, so that when wildfires start they don't have large swathes of un-interrupted fuel.

Community Risk Registers have also led to the formation of Community Resilience Partnerships across Scotland. The Partnerships prepare communities for emergency situations and are supported by SFRS Local Senior Officer Areas to develop improved local responses to events such as flooding and winter conditions. The regions and communities that are affected by floods live with the constant anxiety of not knowing when or if their homes and businesses may be impacted or destroyed. To address these physical and psychological impacts SFRS works closely with communities through the Local and Regional Resilience Partnerships. These multi-agency groups allow a consolidated approach to preparing for flood events by utilising all available assets and resource to respond quickly to mitigate the impacts.

A network of local people with specialist skills or equipment is also held within the Community Asset Registers. This is a Scotland wide database of volunteers who are willing to help during an emergency. The database plots assets on a map so if an emergency incident occurs SFRS can identify those who could help.

In addition to the local work, the SFRS Communications team works to keep Scotland informed on national weather warnings and related resilience advice through a variety of mediums including social media, the SFRS website and local news and media statements.

3.1.3 Developing Capacity to Respond to New and Increasing Risks

Wildfire Response

Wildfire prevention is of particular importance due to their scale and because they are often fuelled by peat, resulting in even greater carbon emissions. The increase in the number of wildfires in Scotland requires SFRS to use new methods to prevent and fight the fires. One of the main methods for doing this is through the practice of Muirburn, which involves starting controlled fires to remove fuel from the areas the fire is travelling towards and letting the fire naturally extinguish itself. This seems counter intuitive, but when carried out correctly, Muirburn fires burn with low intensity and quickly, thus removing the surface fuels without the peat layer becoming involved. This is important because the peat is the carbon storage layer of the soil and carbon emissions are considerably higher when it burns. Through the Scottish Wildfire Forum (SWF) we are working hard to promote safe Muirburn practice and fuel management across Scotland.

Flood Response

Currently, 1 in 22 of all residential properties in Scotland are at risk of flooding from rivers, the sea or heavy rainfall, and by 2050 it is estimated that the annual cost that floods will have upon UK business will exceed £1 billon. As discussed in Section 1.2, climate change is predicted to increase and intensify Scotland's rainfall, resulting

in more flooding. This increased risk will inevitably require a response from SFRS to support communities in coordinating and implementing local response plans and to respond to emergency incidents.

As mentioned in Section 3.1.2, Community Asset Registers can play a vital role in supporting the response to emergency incidents. Due to the widespread and unpredictable nature of floods, the availability of local resources and support is invaluable to SFRS. This may come in the form of additional boats, flotation aids and pumping equipment in rural locations, but can also include other technologies such as drone mounted cameras to help chart flood waters.

SFRS has 66 flood response stations strategically placed around the areas of Scotland that are most at risk of flooding. These 66 stations are supported by an additional 20 swift water and flood rescue stations that have the capability to deploy inflatable boats to assist in the rescue operation. SFRS also has high-volume pumping equipment stationed in key locations that can be utilised to divert flood water. The firefighters based at these stations are specially trained in dealing with incidents relating to flooding.

3.2 Tackling our Own Carbon Emissions

SFRS carbon emissions for financial year 2018-19 totalled 19,473 tCO_2e . According to the latest Scottish Sustainable Network (SSN) report for carbon emissions in the public sector in Scotland (2017-2018 data), the Scottish Fire and Rescue Service produced 0.77% of the total emissions of all 176 Scottish public bodies. SFRS falls within the national and regional body category and of the 46 of these organisations in Scotland, SFRS produced 3.8% of the total emissions.

In 2015/16 SFRS measured and set a carbon baseline of 23,347 tCO_2e. The baseline is tracked and reported to the Scottish Government on an annual basis through the mandatory Climate Change Duty reporting requirement. The reason for the baseline being set in 2016 is because this was the first time that the single Service had access to the necessary datasets that were required to accurately report the information.

Our measurable carbon emissions come from three main sources namely electricity, gas and fuel for transport (Figure 1). A relatively small amount of carbon also results from water use, fuel consumption and waste arisings.
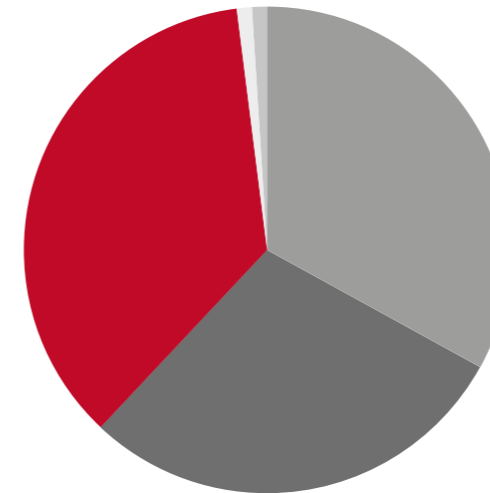
Figure 1: Carbon SFRS carbon Footprint by source (Tonnes CO$_2$e)

- **33%** Grid Electricity (kWh)
- **29%** Natural Gas (kWh)
- **36%** Diesel – 100% mineral (litres)
- **0%** Petrol – 100% mineral (litres)
- **1%** Kerosene – Burning Oil (kWh)
- **1%** Water Supply/Treatment Combined

Carbon emissions for fixed assets (buildings) account for 63% of total SFRS carbon footprint, followed by our mobile assets (Fleet) representing 37% (Figure 2). The most significant cost relates energy use from fixed assets (buildings) at £3.5M and mobile assets fuel use (Fleet) at £2.6M (Figure 3). Water, while not a large carbon footprint, is a significant cost of £0.75M. Cost and carbon emissions from waste will be included in scope from April 2020 as baseline data becomes available.

Figure 2: SFRS Carbon Footprint & Cost Split by Source 2018/19 (tCO$_2$e / £'s)
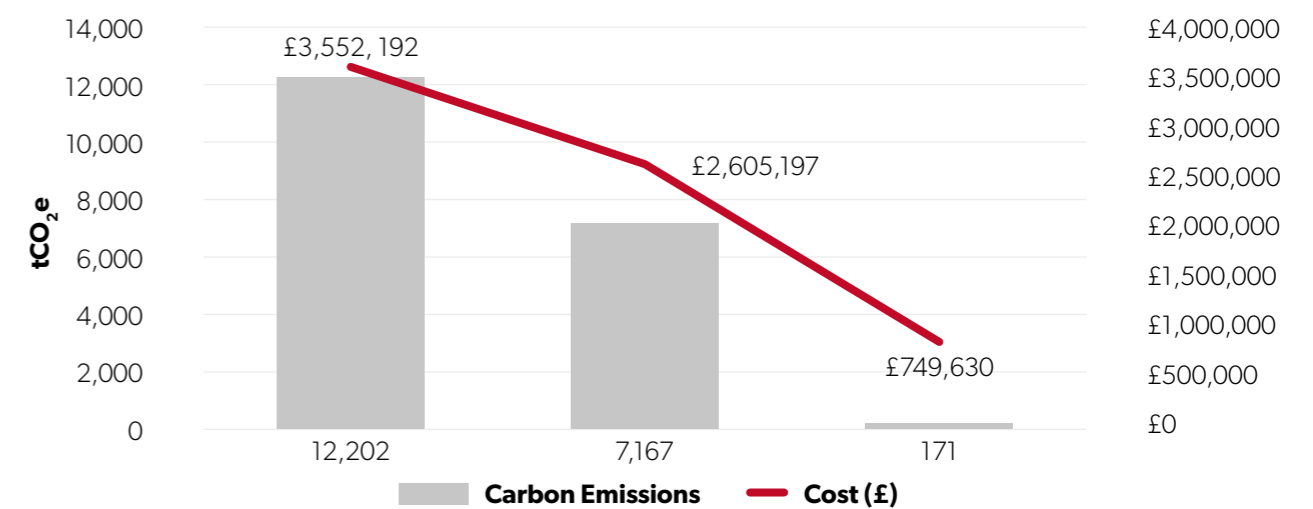
3.2.1 The 2045 Carbon Reduction Plan

The principal Global Goal to be adopted is number 13 Climate Action.

The SFRS intends to align our 25-year approach with a 25-year Policy which will act as the datum to successive carbon reduction project plans intended to facilitate immediate action as set out in SDG13 and to deliver the necessary checks and balances as key milestone dates are reached.

The SFRS has already achieved a 15% reduction in carbon emissions, which has largely been enabled by the delivery of cleaner grid energy sources.

Work is underway to develop our first Carbon Management Plan (CMP). This will be a five-year plan to run from 2020-2025 and will be the first stage in an ongoing 25-year carbon reduction program to 2045. This high level structured plan will set an interim carbon reduction target to be met within the five-year plan period.

The CMP will detail a suite of proposed projects to reduce carbon emissions associated with our buildings, fleet and staff. Many of these projects are in various stages of development. The Sustainability Team are currently running a suite of trial carbon reduction projects over the winter of 2019, the results of which will inform how best to target carbon reduction opportunities and allocate resources efficiently.

We have ten years to reduce carbon emissions by a further 60%. Starting with the 'quick wins' such as reducing energy waste and refining the existing low carbon technologies, we will increasingly need to identify and invest in new approaches to carbon savings as delivering the required reductions will become increasingly challenging. We will strive to reduce our carbon emissions by an average of 6% per annum. It should be noted that some of the technology which is required to deliver a net zero emissions Service has yet to be invented.

SFSR will reduce its direct and operationally associated carbon emissions by addressing the following key areas;

- SFRS Training and Behavioural Change
- Fixed Assets – Electricity and Space Heating
- Mobile Assets – Fleet, Plant and Equipment Fuel

3.2.2 Training and Behavioural Change

Human behaviour has a large impact on the carbon emissions of our organisation through day to day activities. Staff engagement in adopting more sustainable working practise is a core theme in our plan to reduce our impact on the environment and reduce our carbon footprint.

Our commitment to reducing carbon emissions is led from the top with the SFRS Board and Senior Management providing high profile support and maintaining oversight of progress.

The SFRS Sustainability Team are engaging staff and empowering them to make a positive impact in the following ways.

Training and Employee Development (TED)

The Training and Employee Development (TED) function ensures that staff are trained and developed so that they can safely, competently and effectively carry out their role. As our energy consumption and carbon output is heavily influenced by the way in which we use and interact with our fixed and mobile assets, TED is well placed within SFRS to inform and deliver the behavioural change required to achieve energy reduction from our buildings, fleet and equipment.

TED will also be at the forefront of the successful integration of emerging technologies enabling and empowering colleagues to engage safely, competently and effectively with new low-carbon alternatives to existing assets. TED operate several large-scale training campuses and a network of specialist training hubs including, real fire carbonaceous training and the use of specialist fire-fighting processes including the use of foams these sites offer unique environmental and carbon emission challenges.

TED is already working in tandem with the sustainability team to fully identify and improve upon existing training practices with a view to improving pollution prevention and control. Continued endeavours in these specialist fields will inform the behavioural and asset transformation required to deliver a net zero emissions Service.

Green Champions Network

SFRS are developing a national green champions network across the organisation. This network will empower staff to take ownership and implement more sustainable working practises within their own working environment. The network will be supported by the Sustainability Team through provision of suitable tools, information and knowledge sharing.

National Green Action Group

SFRS is part of a national Green Action Group with other UK fire and rescue services and took part in the National Green Action energy saving competition during winter 2018-19. This saw 10 SFRS stations pitted against 50 other stations from across the UK in a bid to reduce their energy use through behavioural change alone. This will be an ongoing annual event.

Engaging New Recruits

The Sustainability Team now engage with new Firefighter recruits during their initial training. The recruits are given a presentation on sustainability within SFRS and what it means within their own roles.
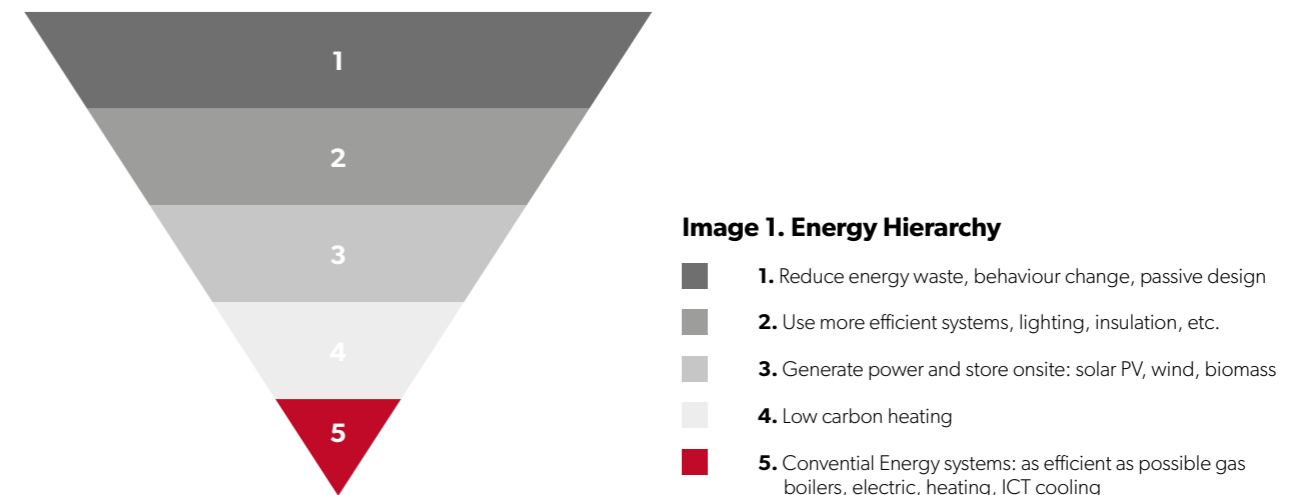
Online Staff Training Modules

A suite of staff training modules on environmental topics are available for all SFRS employees.

3.2.3 Fixed Assets Carbon Management

SFRS Carbon Reduction Route Map 2020-2045

The Scottish Government published its Energy Efficiency Route map in May 2018 for all buildings in Scotland to improve energy efficiency across the entire public estate by 2040. Buildings currently account for 19.7% of greenhouse gas emissions in Scotland (2017 Scottish Government Data). This route map proposes clear long-term energy efficiency standards that will need to be achieved by non-domestic buildings by 2040. We are aligning with the timeline and targets set out within the Scottish government route map and will develop our own 25-year carbon reduction program to 2045. The SFRS route map will align with SG policy, objectives and funding opportunities.

SFRS will follow an established hierarchy of energy management to establish a clear and proven process of reducing energy demand of our buildings, displayed in Image 1. Each project within the Carbon Management Plan (CMP) will follow this common hierarchy. Carbon reduction project plans will form the basis of successive five-year carbon management plans, be contextualised by, and report back to the 2045 Carbon Reduction Plan and will take account of the work that is ongoing within our Service Delivery Model Programme.

Image 1. Energy Hierarchy

1. Reduce energy waste, behaviour change, passive design

2. Use more efficient systems, lighting, insulation, etc.

3. Generate power and store onsite: solar PV, wind, biomass

4. Low carbon heating

5. Convential Energy systems: as efficient as possible gas boilers, electric, heating, ICT cooling

Space Heating

Space heating accounts for the largest proportion of energy use of our buildings and is a mix of gas and electric heating systems. Of our 424 sites, 148 of these are heated by gas, 276 heated by electricity and 5 by heating oil. Gas heated sites are primarily our 74 Wholetime stations and corporate sites, and some retained sites. The electrically heated sites are primarily rural retained sites which are off the main gas network.

SFRS is trialling a number of initiatives to reduce our current dependence on fossil fuels for space heating. We are trialling alternative ways of heating whole time fire stations, which currently represent 70% of our gas consumption. Our National Headquarters (NHQ) has biomass capability which, if delivered, will reduce our gas use by 10%. Our new buildings will be free from fossil fuel use as per the requirement of the Part L Building Regulations.

Within a typical fire station there are two high energy use areas which account for the bulk of the heating energy use, appliance bays and drying rooms. Appliance bays typically represent about 40% of the total heating energy load of a fire station. This is due to these being large spaces heated to relatively high temperatures. Drying rooms which are relatively small spaces use disproportionately large amounts of energy as they are typically being heated to high temperatures 24 hrs day, all year round. Significant carbon reduction opportunities exist in changing the heating strategy of these spaces.

Electricity use

Electricity use accounts for 33% of our carbon footprint. Electricity powers numerous systems within our buildings, however there are some main elements that account for a large proportion of our energy use. Most SFRS retained stations are fully electric, with electric heating accounting for about 60% of the energy use of the building. Other notable high carbon emission areas for electricity use are our lighting, server rooms for our ICT equipment and air conditioning of our corporate sites. Each of these areas presents significant opportunities for carbon reduction across our estate.

As we expand our EV charging networks we are also exploring the potential role of energy storage and micro renewables, and their combined capability to provide bunkered electrical energy. This would offer a similar level of resilience that our existing bunkered diesel fuel tanks offer to fleet.

Whilst we are working hard to reduce our electricity consumption, it is noted that the introduction of electric vehicles will increase it. However, the CO_2e emissions associated with this increase will be offset by the savings made in reducing the number of diesel vehicles in our light fleet. These savings will also contribute to improving local air quality by reducing the particulate matter that is emitted from diesel engines.

3.2.4 Mobile Assets Carbon Management

The fire engine is perhaps the dominant emblem of the Fire Service. Service Delivery depends on a large and varied vehicle fleet and associated specialist equipment. These mobile assets depend on a hydrocarbon fuel, diesel. Fleet fuel emissions accounted for 29% of total SFRS carbon emissions for FY 2018-2019. Our fleet consists of 743 Heavy vehicles and 731 Light vehicles.

The National Transport Strategy 2

The Scottish Government has published a draft National Transport Strategy 2 (NTS2) which identifies transport as Scotland's largest contributor of carbon emissions. NTS2 pledges a series of measures to reduce associated emissions and a key element is to "reinforce the Sustainable Travel Hierarchy to promote and design our transport system so that walking, cycling and public and shared transport are promoted and take precedence ahead of private car use".

SFRS has drafted a Sustainable Business Travel Hierarchy, displayed in Image 2, that aligns with the same principles of the Scottish Government's. The SFRS hierarchy does not include emergency response travel. In addition to introducing the Sustainable Business Travel Hierarchy SFSR will be implementing a number carbon reducing measures to our Light and Heavy fleets.
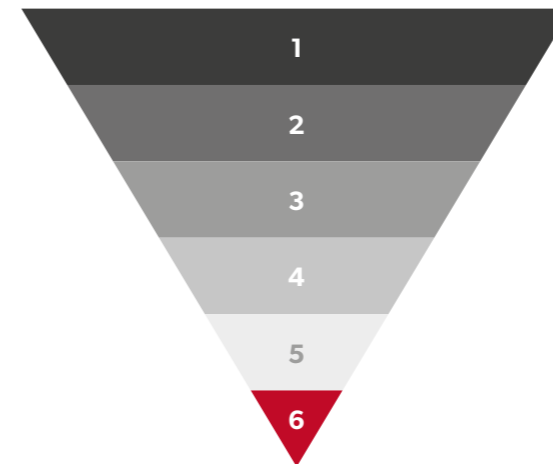
Image 2. Travel Hierarchy

1. Use of video conferencing technology
2. Walking or cycling.
3. Ferry, train, tram and bus.
4. Maximise the number of passengers in a pool vehicle if possible
5. Private cars being used for Service business
6. Air travel only as the final option.

Light Fleet

SFRS has begun a transition to greening our fleet and received a grant from Transport Scotland in 2019 to lease 45 fully electric cars over three years which will be used as pool cars for staff. To support this, we also received a grant from the Energy Saving Trust in May 2019 to install 10 separate EV charging hubs at ten strategic SFRS corporate sites, which are currently being installed.

We have been working with our partners at Police Scotland and the Scottish Ambulance Service in developing a national Blue Light EV charging network. Transport Scotland is keen to help develop this network and have offered grant assistance of up to 80% funding for the continued roll out of electric vehicles and charging infrastructure for SFRS to achieve this aim.

When the required charging network is in place, and SFRS has assessed the suitability of using EV and hybrid vehicles for emergency response, the existing Flexi Officer response fleet will be reviewed and considered for replacement.

Heavy Fleet & Plant

Technology has yet to find a suitable replacement for diesel heavy goods vehicles, however, delivery of our carbon targets will require the replacement of diesel as the fuel for fire appliances. We are tracking the development of ultra-low emission heavy vehicles and have viewed a prototype fully electric fire appliance. Replacing the existing diesel fleet of fire appliances will be critical to the delivery of a net zero emissions Service.

We are also in talks with a heavy appliance supplier, in collaboration with Transport Scotland and Scottish Enterprise, to carry out research and development into technology to convert diesel appliances to fully electric. Until a feasible option for heavy fleet exists, the focus will be replacing all older appliances with Euro 6 rated appliances.

As the fleet becomes more electrified this will have an impact on our electricity use and therefore potentially increase carbon emissions from electricity, however there will be an overall reduction over traditional diesel burning transport.

In recent years SFRS has invested in new technologies that enhance our firefighting and response capabilities, whilst reducing our impact upon the environment. During 2018/19 34 Rapid Response Units (RRU) were strategically located across Scotland. In addition to the numerous emergency response benefits that the RRUs offer, the vehicles are considerably smaller and lighter than traditional fire appliances. This results in significant savings in the volume of fuel that is used when responding to incidents, therefore reducing CO_2e emissions and improving local air quality.

The measures outlined above align with our aim of reducing the number of Unwanted Fire Alarm Signals (UFAS) incidents and the subsequent number of blue light journeys. SFRS have developed a number of initiatives to reduce UFAS, working with duty holders on prevention and reducing the number of appliances attending specific premises based on a risk assessment. This has resulted in a significant saving of vehicle fuel.

3.2.5 Procurement

We recognise our environmental and other responsibilities under the sustainable procurement duty, as outlined in the Procurement (Scotland) Reform Act 2014. We will continue to review our demand for goods, works and services with the aim of reducing, reusing and recycling as our first consideration. When we procure, we will work to influence our suppliers and supply chains to reduce emissions and waste, both in their manufacturing and packaging as well as in their transport, logistics and on-site service delivery.

SFRS is already working with our current Hard and Soft FM service providers to explore what energy and carbon reduction related services we can undertake. Also through our existing Energy supply framework we are working with our energy supplier to explore similar opportunities.

3.2.6 Carbon Emission Sources Under Review

Baseline data and information is currently being collected on each the following areas, allowing them to be brought into the scope of our Carbon Reporting in the coming years.

Waste

A new national waste contract commenced in March 2019. Through this contract we are collecting detailed monthly data on our waste streams and associated carbon emissions. Once we have collected twelve months of data we will set a baseline for waste carbon emissions. This will inform any opportunities for carbon reduction within this area, and any resource efficiency savings that may exist.

Business Travel

SFRS use a central booking contractor for corporate travel management. Through this process SFRS receives monthly reports on associated carbon emissions from staff business travel on pre-booked transport e.g. trains, buses, flights. Carbon emissions from business travel will be added to our reporting scope form April 2020 through data captured from our corporate travel contractor.

Staff Mileage

As a national organisation SFRS staff are required to travel between our sites and to external meetings for a variety of reasons. At present, this travel is sometimes undertaken in private vehicles. Mileage is recorded for business expenses however converting this into CO_2e is difficult due the wide variety of vehicle types that are used by staff members. Work is in progress to review non-operational business travel arrangements, including the challenge of capturing of carbon emission information.

3.2.7 Research and Development

SFRS is actively working with a number of partner agencies, specialist suppliers and higher education institutes to explore specific research and development opportunities for SFRS. In doing so SFRS will lead the way in identifying innovative solutions for carbon reduction within our operations and assets.

This work has led to a series of carbon reduction pilot projects that are testing new and emerging technologies on SFRS fire stations. These projects are exploring micro generation, energy storage, energy intensity, system efficiencies and data collection and management.

SFRS also works closely with emergency services and third sector organisations from across the UK to share assets and best practice working methods on carbon reduction opportunities.

3.2.8 Funding Streams

The level of funding that will be required to enable SFRS to become a net zero carbon organisation by 2045 is significantly beyond that available through existing funding streams. To achieve net zero emissions the whole of the SFRS estate and fleet will require significant redevelopment and replacement, utilising all available technologies and peer support opportunities.

The traditional funding model for SFRS fixed and mobile assets has been through capital investment, whereby assets are owned by the Service, together with revenue funding which has enabled the performance of the assets to be maintained throughout their working life.

SFRS has a fifty-year model for buildings and a working model of between 6 and 15 years for fleet and equipment. Audit Scotland recognised in 2015 that the Service faces an insurmountable investment backlog of £389million, based on the existing asset base.

The Scottish Government's announcement to target a net-zero carbon Scotland by 2045 has completely overturned this traditional model as the performance criteria of every SFRS asset, fixed and mobile, will need to change. Many of the assets cannot be upgraded and will need to be replaced by low carbon alternatives.

We need a new funding approach, one which will be transformational, allowing fixed assets to meet challenges and performance levels far beyond their original design brief.

The Scottish Government has released grant funding opportunities together with procurement frameworks intended to give access to the range of new and emerging technologies required to deliver a net zero Service. This scale of transformation within a 25-year period will pose the Service, and the entire Scottish Public Sector, significant challenges regarding resource, funding and expertise availability.

The financial delivery model will be as critical as an appropriate energy strategy in delivering a net zero Service. SFRS will continue to engage with the Scottish Government and other relevant public bodies to make the case for additional funding to enable this transformation.

4. PARTNERS

5. THANKS

SFSR would like to thank the Scottish Sustainability Network, Adaptation Scotland and Green Action for their consultation and peer review of the document. SFRS would also like to thank Transport Scotland, The Energy Savings Trust and Scottish Enterprise for their continued support.

6. SOURCES AND LINKS

UN Sustainable Development Goals
https://www.un.org/sustainabledevelopment/sustainable-development-goals/

National Performance Framework
https://nationalperformance.gov.scot/sustainable-development-goals

IPCC Special Report Global Warming of 1.5°C
https://www.ipcc.ch/sr15/

Protecting Scotland's Future: the Government's Programme for Scotland 2019-2020
https://www.gov.scot/publications/protecting-scotlands-future-governments-programme-scotland-2019-20/pages/5/

BIG CLIMATE CONVERSATION The role of Public Sector Bodies in tackling climate change A Consultation
file:///C:/Users/peter.robertson1/OneDrive%20-%20Scottish%20Fire%20and%20Rescue%20Service/Downloads/big-climate-conversation-role-public-sector-bodies-tackling-climate-change-consultation%20(1).pdf

Climate Ready Scotland: climate change adaptation programme 2019-2024
https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/

WMO Global Climate in 2015-2019: Climate change accelerates
https://public.wmo.int/en/media/press-release/global-climate-2015-2019-climate-change-accelerates

Adaptation Scotland
https://www.adaptationscotland.org.uk/

United Nations Climate Change, The Paris Agreement
https://unfccc.int/process-and-meetings#:a0659cbd-3b30-4c05-a4f9-268f16e5dd6b

Scottish Natural Heritage, Climate change Impacts in Scotland
https://www.nature.scot/climate-change/climate-change-impacts-scotland

Sustainable Scotland Network
https://sustainablescotlandnetwork.org/

National Transport Strategy 2. Draft for Consultation July 2019
https://www.transport.gov.scot/media/45149/national-transport-strategy-draft-for-consultation-july-2019.pdf

APPENDIX A. UN SUSTAINABLE DEVELOPMENT GOALS

Global Goal	Link to SFRS Climate Change Response Plan 2045
Goal 1: No Poverty End poverty in all its forms everywhere	
Goal 2: Zero Hunger End hunger, achieve food security and improved nutrition and promote sustainable agriculture.	
Goal 3: Good Health & Wellbeing Ensure healthy lives and promote well-being for all at all ages.	
Goal 4: Quality Education Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	
Goal 5: Gender Equality Achieve gender equality and empower all women and girls.	
Goal 6: Clean Water & Sanitation Ensure availability and sustainable management of water and sanitation for all.	
Goal 7: Affordable & Clean Energy Energy is central to nearly every major challenge and opportunity.	✔
Goal 8: Decent Work & Economic Growth Sustainable economic growth will require societies to create the conditions that allow people to have quality jobs	
Goal 9: Industry, Innovation & Infrastructure Investments in infrastructure are crucial to achieving sustainable development	✔
Goal 10: Reduced Inequalities Reduce inequality within and among countries.	
Goal 11: Sustainable Cities & Communities There needs to be a future in which cities provide opportunities for all, with access to basic services, energy, housing, transportation and more.	✔
Goal 12: Responsible Consumption & Production Responsible production and consumption.	✔
Goal 13: Climate Action Climate Change is a global challenge that affects everyone, everywhere.	✔
Goal 14: Life Below Water Careful Management of this essential global resource is a key feature of a sustainable future.	✔
Goal 15: Life on Land Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.	✔
Goal 16: Peace, Justice & Strong Institutions Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.	
Goal 17: Partnerships for the Goals Strengthen the means of implementation and revitalize the global partnership for sustainable development.	

APPENDIX B. SCOTTISH NATIONAL PERFORMANCE FRAMEWORK OUTCOMES

Outcome	Detail	Link to SFRS Climate Change Response Plan 2045
Children and Young People	We grow up loved, safe and respected so that we realise our full potential.	
Communities	We live in communities that are inclusive, empowered, resilient and safe.	✓
Culture	We are creative and our vibrant and diverse cultures are expressed and enjoyed widely.	
Economy	We have a globally competitive, entrepreneurial, inclusive and sustainable economy.	
Education	We are well educated, skilled and able to contribute to society.	
Environment	We value, enjoy, protect and enhance our environment.	✓
Fair Work and Business	We have thriving and innovative businesses, with quality jobs and fair work for everyone.	
International	We are open, connected and make a positive contribution internationally.	
Health	We are healthy and active.	✓
Human Rights	We respect, protect and fulfil human rights and live free from discrimination.	
Poverty	We tackle poverty by sharing opportunities, wealth and power more equally.	

APPENDIX C. ACRONYMS

CMP	Carbon Management Plan
CO2	Carbon Dioxide
ECMB	Environment and Carbon Management Board
EV	Electric Vehicle
FM	Facilities Management
FY	Financial Year
GWP	Global Warming Potential
HFSV	Home Fire Safety Visit
HMO	Houses in Multiple Occupation
ICT	Information, Communication and Technologies
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt Hours
LSO	Local Senior Officer
NHQ	National Headquarters
NPF	National Performance Framework
NTS2	National Transport Strategy 2
P&P	Prevention and Protection
RRU	Rapid Response Unit
SEPA	Scottish Environmental Protection Agency
SFRS	Scottish Fire and Rescue Service
SG	Scottish Government
SGD	Sustainable Development Goals
SSN	Sustainable Scotland Network
SWF	Scottish Wildfire Forum
TAP	Thematic Action Plan
tCO2e	Tonnes of Carbon Dioxide Equivalent
TED	Training and Development
UFAS	Unwanted Fire Alarm Signals
UK CCRA	UK Climate Change Risk Assessment
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organisation

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